

Business Function, Collaboration and Communication

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4.1 - Introduction and Background

Imagine that you have no access to your smartphone or the Internet for a month. Would you be able to cope? What would you do? Get extremely bored? Maybe even start twitching? Would you begin to go crazy and feel all alone, constantly thinking about what could be happening in your online social world? Most people in society today cannot go for very long without checking for text messages, emails, Facebook updates, the latest tweets, snapchats, etc. For most individuals, checking their phone is the first thing they do when waking up every morning. It has become a daily routine and an integral part of their social lives. However, this is not very surprising: humans are naturally social beings. They work together, live together, play together, learn together, interact with each other, and socialize (Preece 2017).

How do people communicate and collaborate in their social, business, and everyday lives? Examine how the development of an assortment of communication technologies has changed everyday life for average people – the way they keep in touch, make friends, and coordinate their social and business networks. Conversation mechanisms that have been used in face-to-face interactions have changed with the introduction of various kinds of computer-based conversations that take place at a distance. Telepresence, where technologies have been designed to allow a person to feel as if they are present or to give the appearance of being present at another location, is developing rapidly. Lastly, technologies have been developed to enable new forms of interaction that focus on how shareable technologies can facilitate and support collocated collaboration.

Talking has been a part of the human culture for hundreds of years, and it comes effortlessly and naturally to most people. However, being able to hold a conversation is a highly skilled and collaborative achievement, having many similar qualities to a musical ensemble. Let's examine what makes up a conversation. We start by exploring what happens at the start of a conversation:

A: Hey there.

B: Hi.

C: Hello!

A: You doing all right?

C: Yeah, I'm doing well. How about you?

A: Great! What about you?

B: I'm all right. What are your plans for today?

Such mutual greetings are common. A dialog may then start to take place in which the participants typically take turns asking questions, giving replies, and making statements. Then, when one or more of the participants wants to bring the conversation to a close, they will do so by using implicit or explicit cues. An implicit cue would be an indirect signal from one participant, such as looking down at their watch, which would indirectly signal to other participants that they want the conversation to come to a close. The other participant can choose to either acknowledge this cue or keep talking and ignore it. Either way, the first participant may follow up by offering an explicit cue by saying, 'Well, I must be off now. Got a lot of work to do' or 'Oh, would you look at the time? I have to go meet someone soon.' Following acknowledgement

by the other participants of implicit or explicit signals, the conversation ends with what has become a farewell ritual. The different participants take turns saying ‘goodbye,’ ‘bye,’ or ‘see you later’ to one another. Often, people will repeat this farewell ritual several times before they separate.

Remote conversations became a possibility when the telephone was invented in the nineteenth century by Alexander Graham Bell. This enabled two people to converse at far distances for the first time in history. Telephones are the pioneer communication device and helped pave the way for newer technologies to develop and emerge. Some of these newer technologies for communication and collaboration include videophones, video chat, and Voice over Internet Protocol (VoIP). In the late 1980s and early 1990s, new media spaces were being experimented with. The goal of this experimentation was to find out if it was possible for people who are distributed over space and time to communicate and collaborate with each other as if they were physically present. (Preece 2017)

Face-to-face conversations have remained central to most of our social interactions; however, the use of social media has increased dramatically. Many people now routinely spend several hours a day communicating online, whether through texting, emailing, tweeting, or instant messaging. This universal uptake of social media in mainstream life has resulted in many people now being connected in multiple ways over time and space, ways that seemed unimaginable twenty years ago. For instance, the average number of friends adults have on Facebook was 338 in 2014. (Preece 2017) The way we make contact, who we connect to, how we stay in touch, and how we maintain our social networks have been permanently changed.

Given all the ways to communicate now, how do people decide which one to use and when? Generally, people move seamlessly between the different platforms available for collaboration. One might send a text if they want to send a quick, informal message; they might send an email if they want to send a longer, more formal message or other content. One of the downsides to all of these new messaging applications is that it can sometimes be confusing. It can be easy to forget who is in what group chat or who you are currently in conversation with, and mistakes can easily be made. For example, someone may shoot off a message or picture to the wrong group or person, not paying attention to who the message was addressed to, and totally think that they are in conversation with someone else.

A key question that is raised by this is are the ways we live and interact with one another changing? How do we deal with the dramatic increase in social networking in our day to day lives? Have the conventions, norms, and rules established in face-to-face interactions been adopted in social media interactions? Have new norms and rules emerged? Are there new kinds of conversational mechanisms for the various kinds of social media? For example, do people greet each other the same way if they are chatting online via FaceTime, or chatting face-to-face at a party? With all of the diverse social applications available, how do people choose which one to use for their various business and social activities? The answer to these questions comes from researching the core social mechanisms that exist in face-to-face interaction, and whether they have remained or have been replaced with other mechanisms in online social interactions.

4.2 - Business Definition and Requirement Analysis

Business is defined by the Cambridge dictionary as “the activity of buying and selling goods and services” and goes further to explain it as “The degree of success of a company or your work.” By these

definitions, a business is not a person or group of people but is an action that that individual or group performs. What does a successful business look like? What attributes would an ideal business poses? How would you quantify the businesses success? What defines a business? Is it the value that it sells or the customers that it serves? Is it the business model that it creates?

The business model is a representation of how a business is conducted by any individual company. It is how a business creates value and harvests that value. It serves the purpose of answering important questions about a business. Joan described these questions as “Who is the customer? And what does the customer value?” and also “...how do we make money in this business?” (Magretta, *Why Business Models Matter* 1) The business model is a key component to defining what a business is. A proper business model is developed dynamically, taking advantage of an opening in the market and by changing the rules. (Magretta)

It is essential for businesses to define themselves: “The losers in the industry – the chronic underperformers like Kmart – are companies that tried to be all things to all people.” (Magretta) The point of a business is to create a value and is not based off of the value of other companies. Building businesses around an idea that already exists is doomed to fail. With the help of innovation, a “winning” business is one that is clever enough to spot an opportunity to change the game and takes advantage of it.

Users and customers are often encouraged to participate and directly communicate with developers in the software development process. Users are not just the means to make value in a business. Users hold a much larger value in the development process. Some businesses will even go as far as to hire everyday people onto their staff to help with the development process, although this approach has some downsides. Users that work full-time sometimes experience a disconnect from what it is to be a user, as they are usually directly involved with the current development process. This, of course, can cause issues with correctly identifying what the users’ needs are during development. Another approach has the users on as part-time employees. This helps, but can still change biases of the users, thus creating more fallacies in the requirements. The best results come from users who are not directly involved with the development process, but this can become an issue when constant user input is needed through each iteration of the development cycle.

A business must understand its product or service, its target customers, and must communicate internally and externally with the people it’s producing for and with the people who are producing the service or product. Therefore, a business must have a clear idea of who they are selling to and what their needs are. Consistent management over the creation process will increase communication amongst the team. Most businesses are likely to fail if they do not involve users in the development process and set a clear understanding of what they are expecting from the product. This is where documentation plays an important role.

Systematic approaches to documentation increase the level of confidence of the end deliverable and enhance the product’s success through its usability, marketability and ease of support. (Noela Jemutai Kipyegen and William P. K. Korir, 2013) Documentation helps projects in all parts of the lifecycle. It provides a clear understanding of user requirements during the requirement analysis phase. It helps the developers conceptualize the design of the product and all of its intricate pieces during the design and implementation phases. Furthermore, it helps debugging and repair for any post-launch support the product may need. There can be no mistaking that documentation is important.

Perhaps the most important documentation is in the earlier stages of development, as this forms the foundation of the entire production: the System Requirement Specification or the SRS. Requirement Analysis is the examination of an organization to determine the most effective amplifiers and attenuators to build. (David C Hay, 2003) In short, requirement analysis is careful consideration of what is needed with some given constraints. Requirement analysis is the next step after an idea has been abstracted. The developers must consider everything that needs to be added for the product to work, also known as the functional requirement. They must also consider things that may be necessary to incorporate into the design, such as security or performance, also known as non-functional requirements (Frank Tsui & Orlando Karam & Barbara Bernal, 2018). These requirements are discussed in detail with the user. They must consider constraints in production such as programming languages and the tools they possess. After the constraints and requirements are discussed, they must be reviewed and validated by the user. It is important to know needs and limitations before beginning a large project.

Requirement analysis isn't just a starting point; it is a process that must be returned to countless times throughout production in multiple iterations. Before a product is released, it should be prototyped and tested by the community so that they can properly communicate where the product meets their needs and where the product falls short. After a product is released, the requirements must be revisited to adjust for where the product can be either fixed or improved. This constant revisiting of the requirements help keep the product focused on the customer and keeps contact between the designers and their customers.

Requirements analysis takes place in two phases: clustering and prioritizing. Clustering is when the developers separate the design pieces into individual parts. They then group these parts into groups that share similar functionality. After the pieces are grouped, they are then prioritized by being given a value that represents their overall importance. These numbers are compared and then normalized, usually represented in a graph format, where x and y are similar to show comparisons. After normalization and prioritization, the final product is an understanding of the order and significance of each piece both to the developers and the users of the product being produced.

As the customers are what gives a product purpose, it is imperative that a customer's needs are centered. Short-circuiting the requirements analysis step can lead to unnecessary functionalities and wasted resources, or even worse, a product that has no traction. According to the CHAOS report (1995), having a clear statement of requirements was the third largest contribution to the success of programs, only outpaced by executive management support and user input, which can be associated with requirement analysis as well. Also, lack of requirement analysis was one of the top reasons for project failures. The analysis gives a clear idea to those working on the project as to what purpose this product serves, what functionalities should be present, and what constraints they have to follow, giving them a clear understanding as to what they must do.

Real world studies performed by Tracy Hall, Sarah Beecham and Austen Rainer show that nearly 68% of developers, project managers, and senior managers agree that their everyday struggles are due to poor requirements handling. The impact of requirement analysis can further be recognized at a business level. Tracy Hall, Sarah Beecham and Austen Rainer's studies revealed that the maturity level given by the CMM have a correlation with the recognizing of requirements deficiencies. They state that:

"The level 3 companies report quite a high level of requirements problems. These companies are probably mature enough to identify all requirements problems and to actively seek out process weaknesses." - (Hall, Beechman, and Rainer)

This shows that the current maturity level of a business can greatly affect the chances of catching requirements errors. The more experienced businesses can see that by missing requirements at validation, they create more problems down the road. This causes the scope to constantly widen, creating ambiguity as to what the purpose of the project is.

The main goal of requirement analysis is to establish communication between the developers and the customer. It is this reason that makes requirements analysis an essential part of the developmental life cycle. The communication between the customer and the developers help prevent later problems in the completion of a project. This establishes that communication is at least as important as coding. (Karl Weigers & Joy Beatty, 2014) Many issues that come up throughout the implementation process can be directly linked to earlier missed requirements in setting good communication between the developer and the user. This is why validation and verification from the user is important. Without the users' consent there can be no assurance that the design is complete or correct.

There are many techniques used in requirement analysis to collect user data that have been tried and tested for many years for their pros and cons. Some of the major types of requirement analysis covered include use cases, storyboards, interviews, and questionnaires. Use cases require less input from the user and look more into the logical design of a given project. Storyboards are great way to conceptualize what a user might see in a project, and how they might use it. Interviews are a great way to collect data from potential users, taking advantage of initial impressions. Questionnaires are more accessible but are very limited in scope, leaving no room for input that may have been missed by the designer of the project.

Use cases are diagrams that show each user, or system, that will use the project. It is a great way to work through the business flow of a project. It consists of drawn representations of a user and lines representing their interaction with the system or other users. These lines connect to labeled boxes that represent the parts of the system that the user is interacting with. This method is great for working through a project but doesn't keep in mind the users' inputs.

Storyboards put the designers into the shoes of the user. The designer creates a persona of a potential user of their future project. They give the user likes, dislikes, hobbies and even a brief history. All of this information is pertinent to the process, as it helps the designer understand how the user would interact with their program. They then create a short 'story' of the user interacting with their project in a specific case that is within the scope of the project. They note every action from beginning to end and even notate possible thoughts, concerns, or alternative approaches during the story's creation. This takes into account the users' point of view; however, this is all based on the assumptions of the designer.

Interviews are the first requirements gathering that collects actual user input. Interviews can be conducted in two formats: structured and unstructured. During a structured interview, all questions have been pre-determined and are not strayed from. This allows the interview to be repeatable, allowing for consistent data. The structured approach is used to collect quantitative data. This, however, can sometimes miss features that were not included in the question list. During an unstructured interview, questions are also predetermined, but the interviewer may diverge from the question list to elaborate further on questions that might have more depth. This allows the designers to find goals that were not previously established. On the other hand, this type of interview is not as repeatable and will not produce as consistent results. The unstructured view is used to collect qualitative data. (Rehman & Khan & Riaz, 42)

A more rigid form of information gathering is the questionnaire. These are much like scripted interviews; however, the predetermined questions are distributed to a much larger group of users. There is also no interviewer, and it is up to the users to answer all the questions completely. This allows the designers to reach a much larger user base, but who will actually complete the questionnaire cannot be controlled (Rehman & Khan & Riaz, 42). Also, this has the same downsides as the scripted interview in that it leaves no room for missed features that might prove beneficial in the final results.

4.3 - Social Phenomena, Platforms and Tools

As every day passes, new technology is implemented and integrated into our daily lives. At the same time, the boost in tech has led to an automation of many daily, mundane tasks. For example, instead of going down to the local convenience store to buy groceries, you can now order them online via the stores website and have them delivered to your house. This automation has made many basic face-to-face interactions with other people unnecessary. Online social platforms are becoming the new social meeting ground. Not only has this new form of online interaction affected the average person, it has also made its way to the business world. Communication amongst businesses internally and externally has moved more towards the incorporation of online platforms. Collaboration in the office space has moved toward a more decentralized environment. For example, an idea could be conceptualized online and participating parties could build on that idea from the comfort of their homes or at any time throughout their day.

Not only has communication between employees changed, but how companies communicate with their customers has changed as well. When a company has an online presence, they are exposed directly to their customer base. This is an advantage, because customers tend to be more transparent and critical on the products and services that a company puts out. For example, social media users tend to be very vocal with their opinion. Based off these raw opinions from a customer base, companies can decide whether to improve certain aspects.

Increasing online involvement can have some potential drawbacks, however. For example, when setting a strictly online presence for employees to communicate, there can be an increase in fatigue, as constantly being online tends to decrease overall work quality. That is because the brain is constantly bombarded by advertisements, notification, email, etc. and thus causes a decrease in concentration, which in turn could lead to subpar work output by the employee. Also when there is no face-to-face interaction among employees, there can be a tendency for points of view of the employees to become narrow or obscured. By narrowing the point of view, collaboration amongst workers will become more difficult.

Increasing and diversifying the avenues of communications will help any potential negative effects. Face-to-face interaction amongst employees and employers can assist with collaboration, where interactions via social media will help employers and employees get in direct contact with customer base. As long as moderation is put into place to diversify the means of communications amongst a company, it should lead to an increase in overall productivity and develop an online presence where employees, customers, and employers can communicate effectively. (Munmun De Choudhury and Scott Counts)

Having insight into a customer base can be a positive and a negative, in the sense that knowing what customers want and having a hand in achieving that goal is great, but attempting to please everyone is just not feasible. Having an employee concerned over a plethora of problems that face a company causes a sense of anxiety. In “The Stress Potential of Social Media in the Workplace,” Christian Fieseler makes the

case that social media can cause an employee to become overloaded with information, because there is so much doubt and uncertainty thrown in their direction; they can become discouraged with their work (Fieseler 2012). Thus, to prevent such an occurrence from taking place, a balance needs to be met first to keep the employees content and focused on their work. To achieve this balance, it is important to remember that employees need to familiarize themselves with the current landscape of the company. Analyzing the public's perspective of the organization is a good place to start. What is the company struggling with and what are their strong suites? Increasing and encouraging collaboration and communication amongst employees is also a great way for them to become not as overwhelmed with their work. Spreading ideas over a larger group of people will lessen the load on the employees, allowing their work to shine even brighter. With the help of the Internet, collaboration on tasks can be made simple and discussion amongst employees can take place anywhere and at any time throughout the day. Social platforms aid in making it simple for different departments to interact with one another even when they are not able to be in physical contact. This leads to a more streamlined process when working on projects, especially ones that are on a strict timeline.

Collaboration among employees is very crucial in order to successfully obtain a finished product. In “Does social media have a place in workplace learning?” Clive Shepherd states, “Social media has the potential to maximize collaborative learning, not just now and then but on an on-going basis, and not just when and where it suits others, but at a time and place of your own choosing”. Employees can become much more efficient if the means of social platforms are used to communicate. Via the power of the Internet and social platforms, communication and collaboration amongst employees, employers, and customers is made simple, thus leaving room for the employee to focus more efficiently on the task at hand. If moderation and patience are employed, the risks and drawbacks of the integration of social platforms in the office space can be minimized.

4.4 - Training and Documentation Essentials

System training and documentation are both key parts of the user interface engineering process, because, despite developers making every effort to make a product that is both self-evident and self-explanatory, it is almost impossible to achieve perfection in both aspects. Therefore, companies will still need to provide some form of training to its users for them to be able to use the product as efficiently as possible. Along with training, the developer should also provide some documentation which will serve as a reference point (Galits, 2002). Both will be based on the needs of the user, the conceptual design of the product, and the performance goals of the system. However, training and documentation serve different purposes in the goals of the developer and the customer.

Normally when someone hears systems training, they automatically think of the obvious definition: training the user to be able to understand and use the product. However, this definition does not take into account the users' needs and goals. Businesses make investments to put a new system in place in order to achieve a goal. According Rich Mesch, there are four goals that systems training helps the customer to achieve. These goals are behavior change, organizational change, sustainability, and customer impact (Mesch, 2017). When companies implement any new system, they typically want some process within their operation to be more effective. In order to achieve this, implementing the new system will almost always cause individual users to have to change their behaviors. The effect of all users experiencing a change in their behavior is that the organization that is using the new system will also change, which may temporarily throw operations into disarray. Mesch states that it is important to set up a support system in order to get

the business running smoothly again. This is where proper documentation will come in handy. When businesses invest in a new system, they do so believing that the system will stay in place for a long time. Systems training is important for users to be able to develop some expertise so that there won't be chaos when an update is implemented or when new users are introduced to the system. Successful implementation and training means that customers will have an ideal experience, whether the customer is the business itself or an end user.

System documentation serves as a form of communication between the users and the developers in order to help users understand what the products are, the way that the products are intended to be used, their features, and how to use them. When the developer is creating documentation for the product, they must take into account the intended reader. Typically, users of the product will range from those with little or no understanding of software to those who are complete experts. In a business setting, experts tend to be those in the IT department. When introducing a new product, many of the employees would rely on the IT department to help them resolve any issues, rather than consulting the documentation. However, if a less experienced user did consult the documentation, would they be able to understand it? The documentation is typically written by the developers who understand technology and the product they are designing, but may not necessarily understand people. According to David Norman in his book "The Design of Everyday Things", engineers think logically and mechanically like the products they develop and expect the users to be able to think like them. Therefore, they design documentation in a way that could only be understood by those who think like them. This causes more user error because the developer failed to design the product and documentation in a way that could be understood by everyday users. In the case of documentation, it is still necessary, however, to include information that only the experts would be able to understand, such as source code, testing documentation, and API documentation (Smith, 2019), while at the same time including instructions and explanations that the typical user would comprehend. However, putting these together would result in one large document, half of which is useless to the user no matter the level of expertise. This creates the need for different types of documentation for each type of user that addresses different requirements.

In her article, Smith states that "Overall, documentation can be divided into a couple of different categories: process documentation and product documentation." (Smith, 2019) Process documentation is documentation that shows outlines the steps to complete a process and is designed for use by the IT experts. Product documentation is documentation that explains what the product is and how it should be used. Product documentation can be further broken down into two more categories: systems and user documentation. Systems documentation is targeted towards the expert user, as it is more technical and contains information that the typical user would not understand nor need to know. This information describes the product's capabilities and helps the experts within a company determine whether the product would be of use to the company, whether it should be purchased, and how it will run in the company's network. User documentation uses more descriptive wording that can be understood by the average user and explains how to properly use the product. This may include a description of the features and their benefits, troubleshooting information, and suggestions on how to optimize the products performance. By separating the product documentation into these different categories, developers will provide a less frustrating experience for users.

When discussing types of documentation one must discuss the different mediums for documentation. Most people think of things like a book or a user manual that's hundreds of pages long, or the terms and conditions that must be accepted when using new software. These are things that are known

for being read by very few people outside of lawyers. However, as technology advances, so does the documentation that comes with it. User documentation typically has instructions for installing the product, troubleshooting guides, and an explanation of the product itself. Over the years, developers have gotten more creative with how they present this information to the user. While some products do still come with clunky booklets of information, most products come accompanied with smaller quick-start guides as well. However, since most software is downloaded online versus being bought from a physical store, there is no way to provide a booklet to the user unless they download that too. In this case developers have provided the user documentation in the form of Frequently Asked Questions (FAQ) pages, or included the manual in the form of the help button located within the application. Some documentation is provided in the form pictures, videos, and animations that explain how to install the product or to use a provided feature. These are put in by developers either as links within the software or on the website, or more commonly as an interactive tutorial that starts up the first time you use the product. These techniques ensure that the user will not only be more likely to consult the documentation but have an overall better experience with the product, because they can more easily learn how to use the product and understand it.

4.5 - Concise Summary

We are increasingly living in our own digital bubbles. Even when we are physically together – as families and friends in our homes, outside of our homes, and even in public places – most people have their eyes glued to their own phones, tablets, laptops, or any other device available. Sometimes when we do this we are even being oblivious to our family, friends, and colleagues who we might be sitting with, eating with, or traveling with. Teenagers have become “screen-agers.” We live in a time where young kids are having their screen time rationed because all they want to do is stare at a phone screen. Many of us are completely lost without our smartphones, constantly having the ability to flip it out of our pockets or purses to catch up on the latest gossip, news, or snapchat – at the expense of appearing rude to those around us. The new generation of ‘all about me’ health and fitness gadgets, which is becoming more and more mainstream, is making this phenomenon worse. Do we really need smart shoes that tell us when we are being lazy? Or do we need glasses that tell us what we can and cannot eat? Is this what we want from technology – ever more forms of mindless interaction and addiction? The term mindless here is meant indifferent to, unaware of, and blind to what is going on around us. How can we begin to rethink our relationship with future digital technologies that are more mindful? It could be through thinking more about how we can do things together using shared devices, tools, and data – technology that encourages us to be more thoughtful of each other and our surrounding environments.

Human beings are naturally social animals; people will always need one another to collaborate, coordinate, and converse with. The diverse range of applications, web-based services, and technologies that have emerged are enabling humans to do this in more extensive and diverse ways. In this chapter we have looked at some important aspects of socialization, namely communication and collaboration. The main social mechanisms that people use in different conversational settings are interacting face-to-face and at a distance. A number of collaborative and telepresence technologies designed to support and extend these mechanisms were discussed, highlighting core interaction design concerns.

Some key points that can be taken away are that social interaction is a central part of our everyday life, and some social mechanisms have evolved in face-to-face and remote contexts to facilitate conversation, coordination, and awareness. Talk and the way it is managed are integral parts to coordinating social interactions. Many kinds of computer-mediated communication systems have been

developed to enable people to communicate with one another when in physically different locations. Keeping aware of what others are doing and letting others know what you are doing are very important aspects of collaboration and socializing. Social media has brought about significant changes in the way people keep in touch and manage their social lives.

4.6 - Extended Resources

Descriptions & Links

1. Improving Marketing/Logistics Cross-Functional Collaboration in the Supply Chain

<https://www.sciencedirect.com/science/article/abs/pii/S0019850199001145>

2. Supporting Collaboration in Business-to-Business Electronic Marketplaces

<https://link.springer.com/article/10.1007/s10257-004-0034-6>

3. Communication & Collaboration Technology in the Workplace

<https://www.youtube.com/watch?v=zBZXQCfqi8Y>

4. Social Phenomena

https://www.youtube.com/watch?v=bW_1_qddXp8

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